REMARKS/ARGUMENTS

Claim 42 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The applicants believe that the Examiner meant claim 43 rather than 42. Claim 43 has been amended accordingly to correct this inadvertent error.

Claims 29-32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Csadenyi (U.S. 4,846,143) in view of Schlinder et al. (U.S. 6,347,935) and McManus (U.S. 3,653,371). Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Csadenyi in view of Schlinder et al and McManus and further in view of Ahmady et al. (U.S. 5,628,303). Claims 36-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Csadenyi in view of Schlinder et al and McManus and further in view of Gruswitz et al. (U.S. 5,108,284).

In response, the applicants have reviewed the cited references in detail and believe that the claims, as amended, are patentably distinctive thereover for the reasons to be discussed hereinbelow.

The present invention relates to a burner design for an induced draft furnace wherein an inducer (as shown in Fig. 1) draws air, that is heated at the burners, through the heat exchangers and out the flue. The burners in such an induced draft furnace have a jet of fuel introduced into their entrance, and the combustion air is introduced into the burner by being entrained in the fuel jet as it enters the burner. This is a so called atmospheric burner and is substantially different from a power burner wherein the combustion air is forced into the burner by a blower or the like. Further, the combustion process within such an atmospheric burner is much more sensitive to control than a power burner wherein other control features are available. The applicants have designed an inshot burner for an induced draft furnace which is controllable to obtain superior performance, while at the same time reducing the overall length to the extent never before attained.

Each of the Csadenyi, Schlinder and Ahmady references show power burners which include means for forcing the combustion air into the burner. As stated in Csadenyi, "rather than relying exclusively upon the flow of pressurized gas through an orifice to draw combustion air into the burner, a power burner is provided with an

air blower to force combustion air into the burner at a rate in excess of that which could be drawn by a conventional atmospheric burner". Generally, such power burners in addition to an air blower, have other associated features such as devices to promote swirling and exhaust gas recirculation features. These features, of course, are relatively expensive as compared with an inshot burner for an induced draft burner as is used in the present invention. Further, because of the substantial difference in their operation, the features of such a forced power burner are not readily adaptable to use in a simple inshot burner for an induced draft furnace.

Csadenyi shows in Fig. 1 and 2 a blower 86 which blows air into the burner tube 116 through an air aperture in a direction transverse to the longitudinal axis of the burner tube 16 and then through a tube 100. Because of this structural difference from the present invention, and the relating operating characteristics of a power burner as discussed hereinabove, the features of Csadenyi can not be readily adaptable to use in an atmospheric burner such as the present invention.

The Schlinder et al reference shows an industrial blast furnace that again uses forced air combustion. A wind box 12 provides combustion air to the burner at a pressure sufficient to cause it to flow into the combustion zone 14 in a combustion chamber or fire box 16 through an entrance 18 and wall 20 of the combustion chamber 16. A venturi tube 22 having an inlet end 25 is positioned adjacent to and in alignment with entrance 18. The burner assembly 10 is provided with a swirler 34 which is positioned centrally within the outlet end 28 of the venturi tube 22. As described at the bottom of column 5 and top of column 6, the burner uses primary air, secondary air and tertiary air, with the swirler 34 tending to mix the primary and secondary air with the fuel. Thus, the structure and performance of such a forced air combustion burner is so different from the induced draft gas burner of the present invention that the features thereof can not be obviously nor even practically adapted for use in such induced draft applications.

The Ahmady reference shows a space heater with a power burner. Here, a fan 50 operates to create a positive pressure inside the plenum chamber 18 which, in turn causes air to flow into the radiator tube 14 and through burner venturi 68. This

air flow induces the fuel gas delivered from orifice 70 to flow through burner venturi 68. Thus, the operation is exactly opposite from the present invention wherein the flow of fuel causes the air to be entrained in a fuel cell and thereby brought into the system. Again, because of the substantial difference in structure and method of operation, the features of this patent are not readily adaptable for use with an induced draft gas burner of the present invention.

In respect to rejections of certain recited features of the dependent claims, the Examiner has said that "Csadenyi does not explicitly disclose some of the dimensions and outputs of the burner disclosed in applicant's claims e.g. and overall length of less than 5.00 inches and more specifically less than 4.0 inches or a combined length of the venture tube housing and flame retainer being 2.9 to 3.0 inches, a throat diameter of .650 to .70 inches, and more specifically .682 inches, 9,900 Btus per inch of diffuser length, and an exit diameter 1.44 times the throat". But the Examiners considers that a person of ordinary skill in the art would be able to readily obtain these variables through routine experimentation. In support of this argument the Examiner cites that Schlinder shows an exit diameter that is 1.44 x the throat as claimed by the applicants. However, as discussed hereinabove, the applicants believe that the features of a power burner are not compatible with those of inshot burners of an induced draft furnace, and this ratio teaching cannot therefore be obviously adapted to obtain the present invention.

In respect to the McManus reference, it teaches a diffuser tube length to throat diameter ratio of greater than 6. This feature does not relate to any of the independent or dependent claims and the applicants are therefore puzzled as to how these features of this patent may be considered relevant to the applicant's claims.

The Gruswitz et al patent is cited to show an inshot gas burner made of top and bottom plates with spaced apart stampings and crossover channels, as well as flame retention devices with multiple shapes and dimensions. For the reasons discussed hereinabove, the applicants believe that it is not only non-obvious but also technically unfeasible to modify the burner of Csadenyi to incorporate the features of Gruswitz et al as suggested by the Examiner.

For the reasons discussed hereinabove, the applicants believe the claims, as amended, are patentably distinctive over the cited references. A reconsideration of the Examiner's rejections and a passing of the case to issue is respectfully requested.

If the Examiner wishes to expedite disposition of the above-captioned patent application, he is invited to contact Applicant's representative at the telephone number below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-0289.

Respectfully submitted,

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